

# CONSTRUCTIVELY SPEAKING

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## AED-N ELECTRICAL STANDARDS

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### On-Line Electrical Training is Back

**We have recently added 50 more slots to the current Electrical On-Line training course. We would like for you to identify at least one LNQA in your office to take this course. Please email Rex Mols to register for the class. We are currently awaiting the new NEC books before you can begin.**

*BY: AED-N Electrical Team*

The Electrical Team of AED-N has established new electrical standards that will be applied to new construction contracts. The standards are an attempt to improve the quality of electrical installations and reduce construction delays by:

1. Requiring electrician qualifications be submitted with the contractor's proposal.
2. Requiring long-lead time items be submitted earlier in the construction schedule.

These standards have been developed based on policy from TAD (our division), TF POWER (entity established to protect troops and DoD Civilians/Contractors from electrocution and fire), and also feedback from the field. We understand the difficulties involved in constructing safe, functional, sustainable electrical systems with the short construction durations and inexperienced electricians. However, we also believe that "Afghan Great" construction shouldn't compromise the safety of anyone working and living in Afghanistan. In addition to the attached standards, here is list of actions AED-N Engineering is initiating:

1. Creating a list of "approvable" electrical material and equipment. This list will be shared with the field via either Sharepoint or ProjectWise.
2. Creating standard sizes for large equipment (transformers, generators, MDP's)
3. Identifying suppliers that have access to approvable material and equipment.
4. Establishing more realistic product standards, instead of just "UL-listed or approved equal."
5. Passing more electrical guidance to the field via "Constructively Speaking" articles and direct e-mails.
6. Establishing an open line of communication between the field and electrical personnel. Leads for electrical assistance are: Drew Lange (Engineering Branch) and Shafak Pervez (Quality Assurance Branch).

Although these electrical standards are intended to be the foundation for future electrical guidance, the document may be pliable due to changes in policy (TAD, TF POWER, CENTCOM, or other). Some of these changes may require retroactive changes (including change orders to contracts) that are deemed necessary for electrical safety. Cooperation and patience during this ongoing process will be greatly appreciated.



# AED-N ELECTRICAL STANDARDS

## AED-N Electrical Standards

4 October 2010

USACE Construction projects in Afghanistan have long been plagued by electrical problems that create safety hazards and delay project completion. This document identifies the basic electrical standards that AED-N will apply as a foundation for safe, reliable electrical installations.

### Electrical Codes

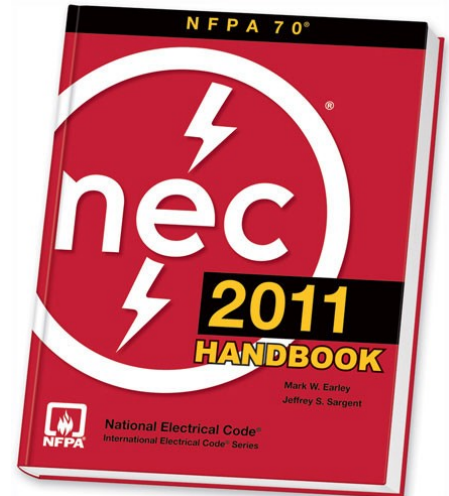
*60 Hz systems (some GWOT and MILCON):*

New construction shall be 208Y/120V, 3 phase, 5 wire (4 wire plus grounding), in compliance with NFPA 70 NEC 2008 or latest edition.

*50 Hz systems (all ANSF, some GWOT and MILCON):*

New construction shall be 400Y/230V, 3 phase, 5 wire (4 wire plus circuit protective conductor using 5 wire TN-S), in compliance with BS 7671 Requirements for Electrical Installations, Institution of Electrical Engineers (IEE), Wiring Regulations, Seventeenth Edition or latest edition.

Most of the installation standards of BS 7671 are similar to the requirements of the National Electrical Code (NEC), but important differences of BS 7671 will be addressed in the AED Design Requirements and through future articles and informative memos to the field.



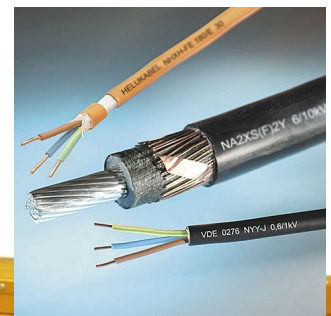
### Electrical Equipment

All electrical equipment and material shall be tested by a Nationally Recognized Testing Laboratory (NRTL) such as Underwriters Laboratories (UL), and display the mark of the NRTL. The alternative to NRTL marking/testing is manufacture to the appropriate IEC standard (IEC 60439 for panelboards) and type-testing by an acceptable testing laboratory. Proof of type-testing must be submitted to verify the quality of the product.

Locally-built products are approvable, but only if the products meet the above requirements. To date, no Afghan-built electrical products have met the above requirements.

The following is a list of "Key Electrical Equipment." These items often require some lead time to acquire:

- Medium Voltage Cable
- Transformers
- Panelboard and Switchgear
- Low Voltage conductors
- Light Fixtures
- Generators
- Fire Alarm Panels



The list of standards by which equipment is approved is in each contract and on the AED Website. AED-N Engineering is working on a list of approved manufacturers and suppliers that will be submitted to field offices to simplify construction submittal review.



# AED-N ELECTRICAL STANDARDS

## Electrician Qualifications

All electrical work shall be performed by Journeymen Electricians and supervised by one Lead Electrician. Apprentice Electricians are allowed to assist the Journeymen, but the ratio of Journeymen to Apprentices shall not exceed 1:3. The definition of Lead and Journeyman differs based on program and project location:

### ANSF Projects

#### Lead Electrician

Proof of Completion of an Electrical Safety Course  
AND  
Proof of completion of an Electrical Code Class (NEC or BS7671) AND  
Graduate of an Approved Trade School AND  
4000 hours of verifiable commercial/industrial electrical experience

#### Journeyman Electrician

Proof of Completion of an Electrical Safety Course AND  
Proof of completion of an Electrical Code Class (NEC or BS7671) AND  
Graduate of an Approved Trade School AND  
2000 hours of verifiable commercial/industrial electrical experience

#### Apprentice Electrician

Proof of Completion of an Electrical Safety Course AND  
Proof of completion of an Electrical Code Class (NEC or BS7671)



### GWOT, MILCON, and select ANSF Projects



#### Lead Electrician

U.S. Master Electrician Certification or License OR  
"Technician Grade" as defined by U.K.'s Joint Industry Board

#### Journeyman Electrician

U.S. Journeyman Electrician Certification or License OR  
"Approved Electrician" as defined by U.K.'s Joint Industry Board

#### Apprentice Electrician

Proof of Completion of an Electrical Safety Course AND  
Proof of completion of an Electrical Code Class (NEC or BS7671) AND  
Graduate of an Approved Trade School

The Lead electrician must be on site at all times during electrical installations and be capable of installing as well as directing the installation of all electrical work in compliance with the governing Code.





## AED-N ELECTRICAL STANDARDS

### Schedule

Early submittal and approval of electrical personnel and products, along with frequent QAB inspections is critical for a successful electrical installation.

Qualifications of Electricians – with Contractor's Proposal.

Approved submittals and order key electrical equipment – by 65% complete design or 35% complete construction.

QAB inspections – 35% , 65% and 95% construction completion

Note: Construction Completion Percentages are for total project completion, not just the electrical construction component.

END

## EFFECTIVE WEEKLY COORDINATION MEETINGS CAN INCREASE PLACEMENT

BY: Sandy Higgins, Chief, Quality Assurance Branch

Weekly coordination meetings must be started with your contractor as soon as construction is started and continue until acceptance. The Project Engineer must establish a routine time and location with the contractor for these weekly meetings. An agenda should be prepared in order to address all issues and not get side tracked. Noting issues of interest form as a method of recording significant issues and due outs on the contract. The weekly coordination should be attended by the Project Engineer, Construction Representative (include LNQAs if one is assigned to project) / Contractor's superintendent and Quality Control Manager. All parties should attend to the greatest extent possible. A successful weekly coordination meeting can prevent possible non-compliance with the contract and help to **push** the contractor forward. Below is an example of a typical weekly coordination meeting agenda for your use. Please take the extra time to prepare for these meetings with your contractor.

### WEEKLY COORDINATION MEETING AGENDA

1. Safety Plan implementation/problems/staffing
  - A. Weekly electrical inspections
  - B. Weekly tool box safety meetings
  - C. Safety deficiencies noted on deficiency list and status
  - D. Activity Hazard Analysis (prepared prior to and used in Prep meetings)
2. Clean-Up/Staffing (housekeeping on site)
3. Security
4. Submittal Register status
  - A. Review report from RMS (identify submittals due and not yet submitted, submittals overdue, etc..)
5. Request for Information Status
6. Review project schedule
  - A. Review critical path activities to indicate current status of critical path work activity in progress – at the time of the meeting
  - B. Review status of the key procurement items
  - C. Review the manpower curve and verify with actual manpower on site

7. QC Plan implementation/problems/staffing
  - A. Quality of noted deficiencies and status
  - B. Deficiency tracking list – maintained by QC and QA
    1. Review report from RMS
8. Coordination problems / other contractors / user/ subcontractors / suppliers
9. Verbal instructions provided to contractor
  - A. As indicated on QC and QA reports (subject to no additional costs or time)
10. Status of potential changes/ outstanding RFP / modifications
  - A. Identify potential changes to the contractor
  - B. Review the status of outstanding RFP – awaiting contractor proposal
  - C. Review the status of modifications in negotiations and modifications awaiting contractor's signature
11. Outstanding correspondence (serial #) – with suspense dates
 

Both government to contractor and contractor to government
12. Field problems
 

Status of resolution of pending field problems

New or potential field problems

# RECOVERY SCHEDULES

*By Philip DiSalvi, Senior Scheduler, Baker Group*

USACE construction contracts require contractors to prepare and submit a baseline schedule, after which periodic schedule updates will be submitted. The update schedules, generally required to be submitted monthly; will show the up-to-date progress of work in place, the current plan to complete the remaining work scope, and will also reasonably forecast a project completion date.

Unfortunately, delays in the construction industry are quite common. As projects progress various unexpected circumstances may arise which may impact critical path progress. Delays can be caused by poor planning, unforeseen conditions, changes in the scope of work, issues with international procurement and delivery of required materials, contractor delays, or any combination thereof.



The primary goal of an update schedule is to reflect the actual status of the project to date, and to project a completion based on the current status and plan to complete remaining scope. If and when the project is delayed for any reason, the monthly update schedule will forecast the project completion beyond the contract completion date.

At some point when the forecasted project completion slips beyond the contract completion date, the contract will generally require a recovery schedule to be prepared and submitted by the contractor. Also known as a Mitigation Plan, a Recovery Schedule is a tool by which a contractor can determine if lost time on a project can be recovered, and if so, to what extent, and by what means.

Pursuant to the USACE 12-step Aggressive Schedule Management System, when a project is delayed by 30 calendar days or more, the COR is required to demand a recovery schedule from the contractor. The contractor should additionally be required to submit the recovery schedule within 7 calendar days of the notice.

Obviously, the recovery schedule's purpose is to recover lost time. Further, the intent of the recovery schedule is to define the contractor's means and methods of recovering lost time on the project, or in other words, mitigating the delay. To that end, various means of recovering lost time can be incorporated into a recovery schedule, including one or more of the following:

1. Increasing work hours or adding a second shift in order to shorten activity durations
2. Adding more workers and equipment to the project with the goal of increasing daily productivity
3. Resequencing of work activities or groups of work activities to allow for concurrency of work thereby shortening the critical path

But is the recovery schedule realistic, or is the contractor simply shortening activity durations to satisfy a contract requirement without putting any real thought into what needs to be done in order to recover lost the time. Following submission by the contractor, the recovery schedule should be reviewed for changes in activity durations and logic to ensure the contractor's plan is reasonable, rational, and practical. The recovery schedule should also be forwarded to the Baker Group at [TAN.Baker.Group@USACE.army.mil](mailto:TAN.Baker.Group@USACE.army.mil) for analysis prior to USACE acceptance.



## RECOVERY SCHEDULES

Due to various circumstances, a recovery schedule may not assure the contractual completion date. However, if accepted by the COR, the recovery plan may become the current baseline from which the project will be managed and monitored for completion against the planned completion date. On the other hand, USACE acceptance of any update schedule or recovery schedule that reflects a project completion beyond the contract completion date does not imply or portend acceptance of, nor in any way represent a change in the contract completion date. Changing the contract completion date can only be accomplished by way of a contract modification.

Schedule narrative reports are a fundamental component of any schedule submission, and as such should be submitted in conjunction with all schedules. As part of the recovery plan, the contractor should be directed to also provide a schedule narrative describing in detail his plan, the assumptions used in developing the plan, and the resources that will be brought to bear in prosecuting the plan. These are all important components of the plan that must be considered when reviewing the recovery plan for feasibility.

When a project faces a serious or continuing delay, the need for a viable recovery schedule is mandated by the contract. Any recovery schedule submitted by a contractor should be analyzed for contract compliance and achievability prior to USACE acceptance. And finally, effective implementation of the recovery plan is a team effort requiring USACE oversight, and weekly monitoring to insure timely execution.

If you have any questions regarding this topic, please contact the Baker Group via email [TAN.BAKER.GROUP@USACE.ARMY.MIL](mailto:TAN.BAKER.GROUP@USACE.ARMY.MIL), or stop by the Azadi Office. With a team of in-country professionals experienced in a broad range of construction specialties, Baker provides construction management support services to the Corps of Engineers, including analysis of contractor schedules (baseline and update), BCOE recommendations and claims evaluations. The Baker group also provides scheduling assistance to contractors, in addition to offering formal schedule training classes. Other services include: RMS support; database development and support; PASS and P2 support; and custom reports from Primavera, RMS, and PASS.



## TRENCH VS. EXCAVATION

What's the difference between a trench and an excavation?



A trench is a narrow excavation less than 15' wide, deeper than it's width

An excavation is a cavity or depression cut or dug into the earth's surface

There is no room for risk. Any condition you ignore or overlook can cause an accident. It is the responsibility of the contractor to prove using unaltered manufacturer tables, a registered professional engineers calculations, or conservation assumptions from the safety manual, that excavations are safe. Opinions not based on factual data are meaningless.





# COLD WEATHER PLANS FOR MASONRY

BY: Sandy Higgins, Chief, Quality Assurance Branch

Cold weather is approaching. Did you know your contractor is required to submit a Cold Weather Plan? Cold and Hot Weather Plans are required to be submitted ahead of time so that the requirements are well understood prior to needing to implement the plan. This way, when that “unexpected” cold snap or heat wave happens, the masonry contractor will be prepared. General requirements to keep in mind for Cold Weather Plans are:

Before erecting masonry walls in temperatures of less than 4 degrees Celsius (40 degrees Fahrenheit), a cold weather construction plan must be submitted by the contractor. In general, the following precautions must be followed:

1. Frozen work shall not be built upon.
2. Heat sand or water to produce mortar between 4 and 49 degrees Celsius (40 and 120 degrees Fahrenheit). Prevent mortar on boards from freezing.
3. For ambient temperatures between -7 and -4 degrees Celsius (20 and 25 degrees Fahrenheit), use heat sources on both sides of walls. For winds exceeding 15 mph, use windbreaks.
4. For ambient temperatures below -7 degrees Celsius (20 degrees Fahrenheit), masonry work must also be done inside heated enclosures with interior temperatures maintained above freezing. Units should be pre-warmed to at least -7 degrees Celsius (20 degrees Fahrenheit).
5. Accelerating admixtures must be non-chloride based. Use of calcium chloride in the mortar should not be permitted due to possible corrosive effects on reinforcement, metal ties, or anchors.
6. Completed masonry must be protected for 24 hours using the following methods base upon the mean daily air temperature (degrees Celsius):
  - A. (4C to 0) protect from rain or snow with weather resistant membrane
  - B. (0 to -4C) cover completely with weather resistant membrane
  - C. (-4C to -7C) cover completely with insulating blankets
  - D. (below -7C) maintain masonry temperatures above freezing by using enclosures, supplementary heat, etc.



**WE NEED YOUR ARTICLES. IF YOU HAVE A GREAT SUCCESS STORY OR INFORMATION TO SHARE PLEASE SEND IT TO THE QUALITY ASSURANCE BRANCH. WE'D LOVE TO HEAR FROM LOCAL NATIONAL QUALITY ASSURANCE REPRESENTATIVES AND CONTRACTOR'S AS WELL.**

# RESPONSIBILITIES OF QUALITY ASSURANCE

## REFERENCE: ER 1180-1-1 QUALITY MANAGEMENT

The following is guidance and a recommended approach to the duties and responsibilities for all QAR to follow ---  
--to assure quality construction --during the performance of random QAR surveillance visits to the construction site for work in progress.



The following is a recommended approach:

- 1- Make an initial visit to the construction site and prepare a list of all work activities in progress --such face brick, CMU, under slab utilities, site work ---etc.
- 2- Arrange the listed work activities in an order of priority or urgency for surveillance.
- 3- Select the highest priority work activity and review in detail all pertinent contract drawing/details, pertinent specifications including all referenced specifications and standards, pertinent approved submittals for materials/equipment, review all modifications/RFI to assure the controlled contract documents are updated in clued the accurate contract requirements.
- 4- Prepare checklists, notes, copies of details, partial copies of specification execution paragraphs to adequate data for a comprehensive comparison of the construction work in progress to the current contract requirements during the surveillance visits.
- 5- Select the next highest priority work activity and proceed as stated in # 3 until all work activities have been subject to a QAR surveillance visit.
- 6- Follow up QAR surveillance visits---During the follow-up visits for surveillance for a specific work activity --the approved sample of workmanship and quality (as agreed during the CQC initial inspection) must be used as the approved sample to compare all further work for this work activity.
- 7- Document or record all deficiencies noted during the QAR surveillance visits.
- 8- Provide the noted deficiencies (with contract reference --specification or drawing / detail) to the contractor's quality control representative for immediate correction or to be included on the continuing construction/safety deficiency list maintained by the CQC.
- 9- Include noted deficiencies on the QAR daily report. ---Advise the project engineer of critical or significant deficiencies which should be corrected immediately to avoid building on deficient work.

Additional information for you to pass along to your LNQA's is to provide them the contractor's schedule so they know what work should be ongoing. Also, give them an Activity Summary by CLIN report out of RMS so that they can identify the ongoing activities in progress and document percent complete. Make sure they are taking accurate photographs for you to verify completed and deficient work.

**MORE TO COME**